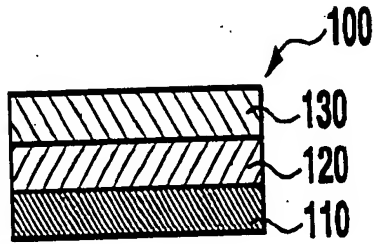
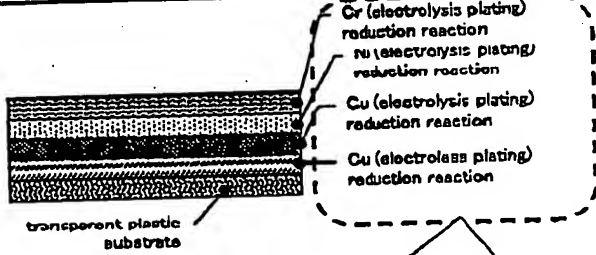
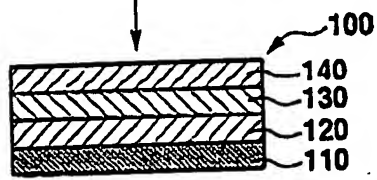
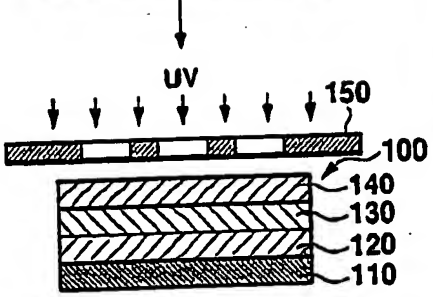
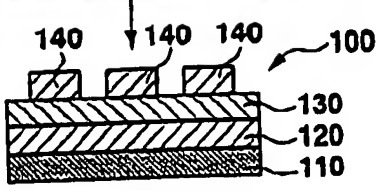
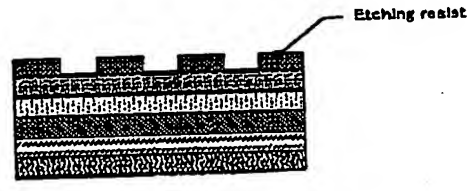
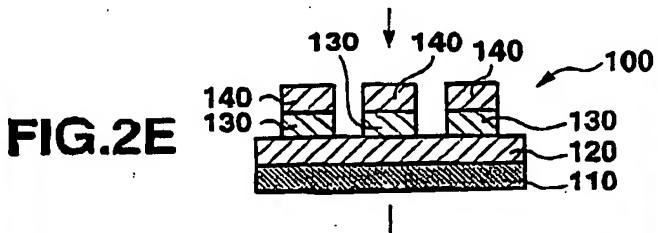
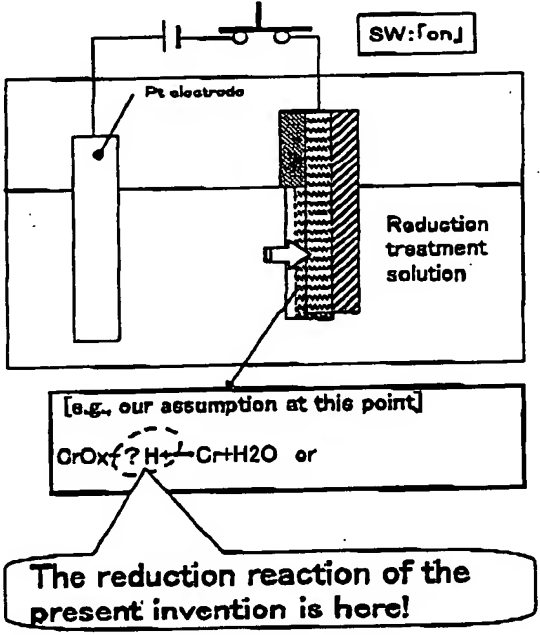
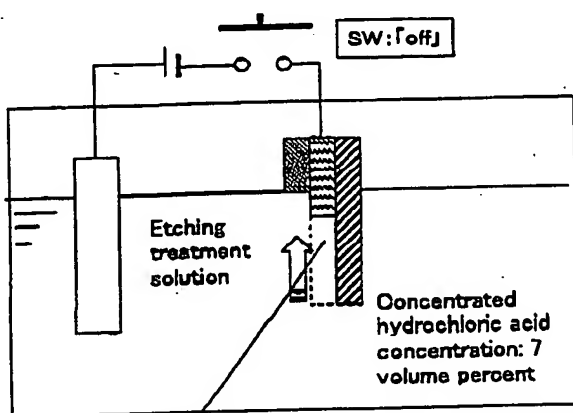
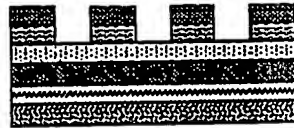
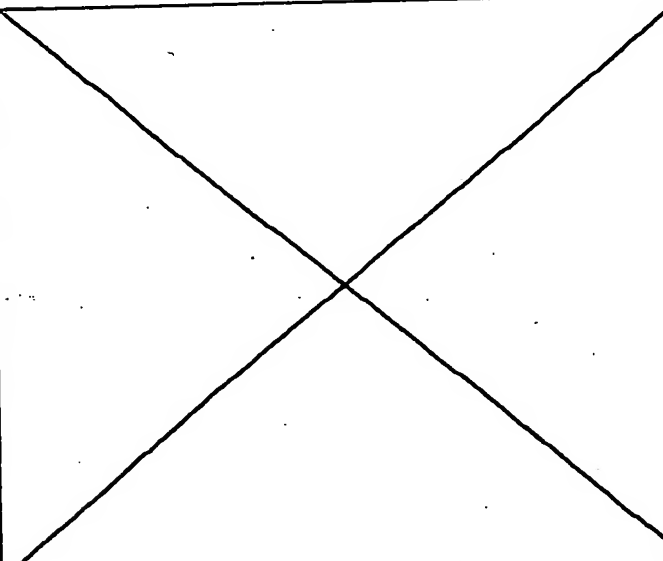
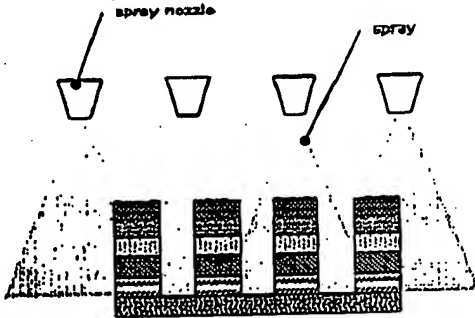
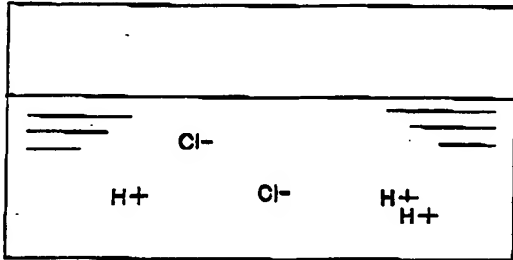
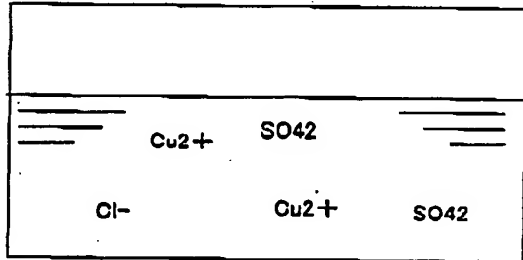
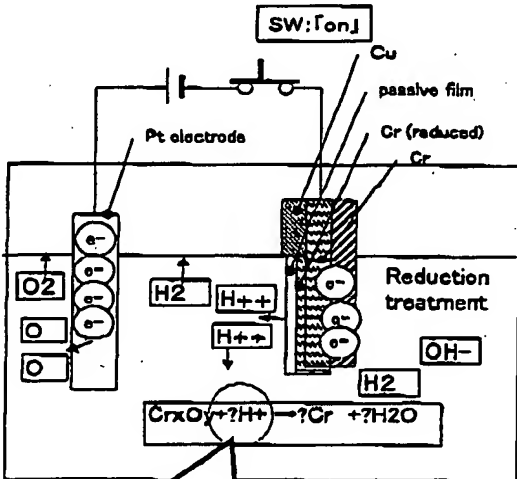
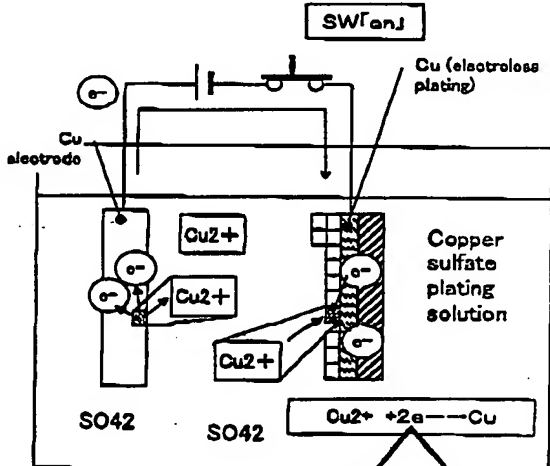


Attachment 1 Comparison between the present application and USP809

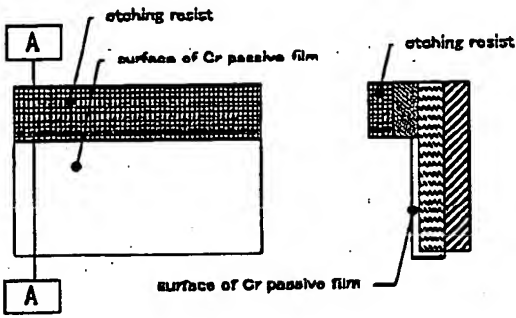
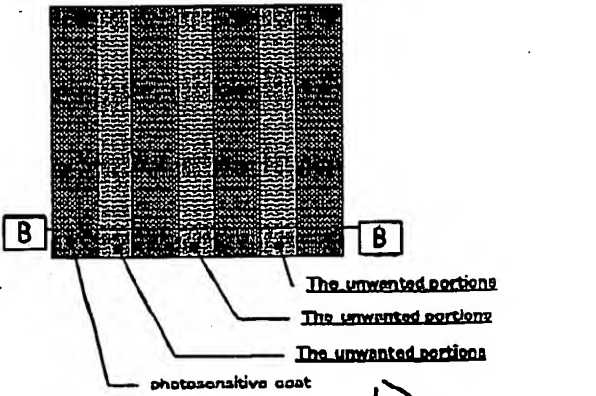
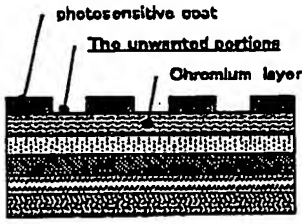
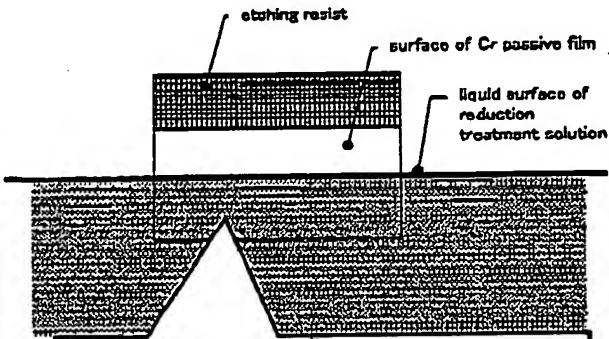
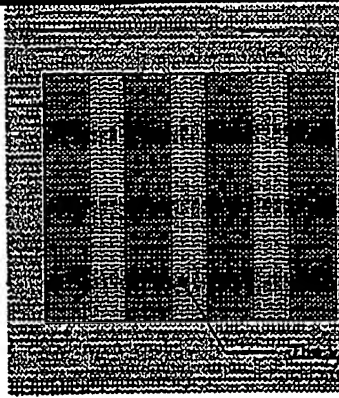
	Invention of the present application	USP809
Invention	<p>The present invention is a chemical treatment method by which a metal film formed on a material to be subjected to film formation is etched into a predetermined pattern.</p>	<p>This invention relates to metal plating plastics, and more particularly to an improved method of metal plating transparent acrylic plastic materials such as polymethyl methacrylate</p>
Object	<p>It is an object of the present invention to provide a chemical treatment method capable of easily etching metals, particularly chromium, unsuited to etching, and a chemical treatment apparatus using this chemical treatment method.</p>	<p>An object of this invention is to provide an improved method for adherently metal plating transparent acrylic plastics such as polymethyl methacrylate. A further object is to provide an improved method for selectively adherently metal plating transparent acrylic plastics such as polymethyl methacrylate.</p>
Structure of the subject substrate	<p>FIG.2A</p> 	 <p>The Examiner indicated and cited this reduction reaction.</p>
Resist patterning	<p>FIG.2B</p>  <p>FIG.2C</p>  <p>FIG.2D</p> 	<p>Descriptions regarding resist patterning in USP809 USP809 col. 3, lines 27-34</p> <p>A photosensitive coating, a resist, is then applied to the chromium plated surface by brushing, spraying or the like. One photosensitive coating which can be used is Dynachem 3140. The photosensitive coating is selectively exposed through a pattern mask and the resultant pattern developed. This leaves an etch resist mask selectively on the metal surface of the plated substrate, corresponding to the metal pattern desired.</p> 

Invention of the present application	USP809
Cu etching	 <p>FIG.2E</p>
Removal of Cr passive film (reduction reaction).	 <p>SW: [on]</p> <p>Pt electrode</p> <p>Reduction treatment solution</p> <p>[e.g., our assumption at this point]</p> <p>$\text{CrO}_x + ? \text{H}^+ \rightarrow \text{Cr} + \text{H}_2\text{O}$ or</p> <p>The reduction reaction of the present invention is here!</p>

Invention of the present application	USP809
<p data-bbox="186 220 738 283">[e.g.] After carrying out cathode electrolysis reduction for a predetermined time, the electrolysis reduction is stopped.</p> <div data-bbox="243 315 812 724">  <p data-bbox="609 598 787 703">Concentrated hydrochloric acid concentration: 7 volume percent</p> </div> <div data-bbox="186 735 812 808"> <p data-bbox="194 745 438 766">[Chromium metal layer]</p> <p data-bbox="194 766 544 787">$2Cr + 2HCl \rightarrow 2CrCl + H_2 \uparrow$</p> </div> <div data-bbox="186 819 812 1050"> <p data-bbox="203 829 812 850">[Hydrochloric acid concentration of the present invention]</p> <p data-bbox="203 871 812 1018">In the experiment data, the hydrochloric acid concentration of the chemical treatment method of the invention of the present application is SAS 5-100 volume percent (about 0.7-14 volume percent when converted into concentration of concentrated hydrochloric acid).</p> </div>	<div data-bbox="958 378 1421 703">  <p data-bbox="1006 609 1396 682">Concentration of concentrated hydrochloric acid: 50 volume percent Temperature of solution: room temperature</p> </div> <div data-bbox="893 724 1485 882"> <p data-bbox="901 724 1372 745">[Hydrochloric acid concentration of USP809]</p> <p data-bbox="893 766 1477 871">USP809 (col. 3, lines 34-37) discloses "The substrate is then immersed for about 2 minutes in a room temperature aqueous solution containing 50 volume percent concentrated hydrochloric acid".</p> </div>
<p data-bbox="146 1249 178 1627">Cu/Ni etching (oxidation reaction)</p> 	<div data-bbox="966 1186 1453 1522">  <p data-bbox="1079 1197 1185 1218">spray nozzle</p> <p data-bbox="1339 1218 1388 1239">spray</p> </div>

	Present application	USP809
treatment solution	<p>reduction treatment solution</p>  <p>Cations can be of a metal type which does not form a metal film of Na, K, and the like, or ammonium ions which are non-metal. The present invention does not include metal ions which are reduced by a cathode to form a film.</p>	<p>copper sulfate plating solution</p>  <p>It is essential that the ion of the metal to be deposited is included in the solution. The object of including halogen in the plating solution is to provide the solution with favorable conductivity, or to make the dissolving of the anode (copper in a case of copper plating) easy.</p>
cathode reduction reaction	 <p>The reduction reaction of the present invention is here!! Oxygen is taken from chromium oxide by nascent hydrogen, and chromium oxide is reduced to chromium.</p> <p>Oxygen is taken from chromium oxide by "nascent hydrogen" produced when carrying out cathode electrolysis reduction to a passive film on a Cr surface, and chromium oxide is reduced to chromium.</p>	 <p>In the reduction reaction of USP809 which has been indicated and cited by the Examiner, Cu ions obtain electrons, and are reduced to metal.</p> <p>In cathode reduction during copper electroplating, copper ions in the copper plating solution receive electrons on the surface of the cathode, and are reduced to copper.</p>

VS

	Portion of the present application	Portion of disclosure of USP809
After resist patterning	 <p>Section A-A</p>	 <p>USP809 (col. 3, lines 37-39) Showing the portion described "This selectively etches away <u>the unwanted portions of the chromium layer</u>".</p>  <p>Section B-B</p>
Immersed state	 <p>Showing the "portion" described in claim 8 of the present application, "(Currently amended) A method according to any one of claims 1 to 6, wherein the cathode electrolysis reduction step comprises dipping <u>a portion of the metal film into an acidic reduction treatment solution containing a halogen ion</u>".</p>	 <p>Concentration of concentrated hydrochloric acid: 50 volume percent Temperature of solution: room temperature</p>